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No. 111 Health, Education, Recreation

THE MONEY COST OF REPETITION
versus
THE MONEY SAVING THROUGH ACCELERATION

BY
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The Money Cost of Repetition

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versus

The Money Saving Through Acceleration

After a campaign of education extending over many years Congress, through its Food and Drugs Act, has compelled manufacturers of food and medicinal products to print on the labels of the packages a list of the ingredients, with the quantity of each. Recently, another campaign of education has been waged by schoolmen to secure in the publication of school reports a plain statement of the ingredients of the statistics put out for popular consumption. The second campaign resembles the first in that it grew out of the discovery that educational statistics, like food products, are frequently adulterated with dangerous coloring matter that enhances their appearance but detracts from their usefulness.

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The present article is an attempt to identify and measure some of the ingredients that are active elements in the data that tell us how much American cities spend on public education, and what they get for their money. It is based on the returns from a co-operative investigation conducted in the spring of 1911 by the Division of Education of the Russell Sage Foundation and the superintendents of schools of twenty-nine cities.

This investigation gathered the school histories of the 206,495 children enrolled in the eight elementary grades of these cities at the close of the school year 1910–1911, and the resulting data show, among other things, the number of years of schooling required by each of these children to reach the grade in which he was at that time. These progress data throw light on some phases of the relation between school expenditures and school results.

Slow, Normal, and Rapid Progress

In many studies made in the past few years investigators of school conditions have endeavored to compute the cost to the school system of the repetition of grades by children who make slow progress. The common method of these investigations

has been to find the total cost of repetition by multiplying the annual per capita cost by the number of children who were repeating grades. These studies were open to criticism because in general they failed to take into account the fact that while many children repeat grades, and thus involve increased expenditure, there are also many children who make rapid progress and thus counterbalance part of this added expense.

Now it is evident that if the number of years lost by slow children in a school system were equalled by the number of years gained by those making rapid progress, the money expenditure would be just the same as though every child were regularly promoted every year. Moreover, this gratifying condition would indicate that the course of study and system of promotions were so accurately adjusted to meet the needs and abilities of the children that the average children progressed at the normal rate, the slow ones required somewhat more time to do the work, and an equal number of bright ones were able to do it in less than the normal time. The data of the investigation under discussion show how nearly the different school systems studied approach this standard.

For example, the records show there were 2371 children in the elementary grades of Amsterdam, New York, at the close of the past school year. Their distribution by grades shows how many years of schooling would have been taken by these children to reach their school standings at that time if they had all uniformly made normal progress. The figures are as follows:—

I. NUMBER OF CHILDREN BY GRADES AND TOTAL NORMAL YEARS OF SCHOOLING OF CHILDREN IN ELEMENTARY GRADES, AMSTERDAM, NEW YORK, JUNE, 1911

Grade	Number		School Years at Normal Progress		Total Normal Years of Schooling
1	323	×	1	=	323
2	354	×	2	=	708
3	362	×	3	=	1086
4	413	×	4	=	1652
5	330	×	5	=	1650
6	227	×	6	=	1362
7	182	×	7	=	1274
8	180	×	8	=	1440
Total	2371				9495

Now, in point of fact these 2371 children had not made uniformly normal progress. Their actual progress records showed the following:—

5 years slower than normal	1
4 years slower than normal	3
3 years slower than normal	31
2 years slower than normal	135
1 year slower than normal	321
Normal Progress	1167
1 year faster than normal	675
2 years faster than normal	30
3 years faster than normal	6
4 years faster than normal	1
6 years faster than normal	1

A computation based on these figures shows that the children who had made slow progress had lost a total of 701 years, while the rapid ones had gained a total of 763 school years. This makes Amsterdam's accounting for all the children in her elementary schools the following:—

Total normal years of schooling, all pupils		9,495
Debit: Years lost by slow pupils	701	
		10,196
Credit: Years gained by rapid pupils	763	
Years actually required by all pupils		9,433

This accounting shows that the years actually required by all the pupils in the Amsterdam schools to reach their present standing was slightly less than the normal number of years. In terms of percentage it was 99.3 per cent of normal. To put this in another way, the taxpayers of Amsterdam have a right to demand that their public schools shall carry each child through as many progressive steps of the educational system as is compatible with covering each step thoroughly. They expect to pay extra for each child who must do one unit of work twice, and they expect to pay less for the education of the bright child who completes the work in less than the normal time. In point of fact, the rapid children a little more than counterbalance the slow ones, with the result that the taxpayers actually pay ninety-nine cents for each dollar's worth of school progress made by her public school children.

But the situation in Amsterdam is almost unique. There are few cities where the years lost by slow pupils are so nearly

counterbalanced by those gained by the rapid ones. The following table shows the relation between years lost and years gained in each of the twenty-nine cities:—

II. PUPILS IN THE ELEMENTARY GRADES, TOTAL NUMBER OF YEARS LOST BY SLOW PUPILS, TOTAL NUMBER OF YEARS GAINED BY RAPID PUPILS, AND RATIO OF YEARS LOST TO YEARS GAINED, JUNE, 1911

City	Pupils in Elementary Grades	Years Lost by Slow Pupils	Years Gained by Rapid Pupils	Ratio of Years Lost to Gained
Amsterdam, N. Y.	2,371	701	763	0.9 to 1
Bayonne, N. J.	7,033	3,741	1,516	2.5 to 1
Canton, Ohio	5,567	3,445	120	28.7 to 1
Danbury, Conn.	1,967	761	467	1.6 to 1
Danville, Ill.	2,260	1,197	164	7.3 to 1
East St. Louis, Ill.	5,380	2,883	933	3.1 to 1
Elizabeth, N. J.	7,058	3,777	987	3.8 to 1
Elmira, N. Y.	2,487	1,383	314	4.4 to 1
Hazleton, Penn.	2,655	1,577	77	20.5 to 1
Indianapolis, Ind.	23,874	7,721	5,261	1.5 to 1
Kenosha, Wis.	2,223	1,265	174	7.3 to 1
Milwaukee, Wis.	32,251	9,115	6,019	1.5 to 1
Montclair, N. J.	2,568	1,880	277	8.3 to 1
Muskegon, Mich.	3,163	1,419	447	3.2 to 1
New Orleans, La. White	23,664	11,714	3,638	3.2 to 1
New Rochelle, N. Y.	3,641	1,804	880	2.1 to 1
Niagara Falls, N. Y.	3,244	1,506	195	7.7 to 1
Passaic, N. J.	5,541	3,200	895	3.6 to 1
Perth Amboy, N. J.	3,947	2,878	639	4.5 to 1
Plainfield, N. J.	2,312	1,253	171	7.3 to 1
Quincy, Mass.	4,540	2,705	190	14.2 to 1
Racine, Wis.	4,075	1,496	138	10.8 to 1
Reading, Penn.	10,585	7,860	683	11.5 to 1
Rockford, Ill.	5,649	2,156	963	2.2 to 1
Schenectady, N. Y.	7,846	4,002	867	4.6 to 1
Syracuse, N. Y.	13,610	7,118	1,177	6.0 to 1
Topeka, Kansas	4,894	1,913	627	3.0 to 1
Trenton, N. J.	8,787	5,507	789	7.0 to 1
Watertown, N. Y.	3,303	2,023	392	5.2 to 1
Total	206,495	98,000	29,763	Average, 6.5 to 1

A glance at the figures in the right-hand column shows that conditions vary so greatly in these school systems that the proportion between years lost and years gained ranges from virtual equality in such cities as Amsterdam, Milwaukee, and Indianapolis to extreme inequality in cities where the number of years lost is from twenty to thirty times as great as the number

of years gained. In the average city the ratio is six and one-half years lost by slow progress for every year gained through rapid progress. No clearer demonstration could be made of the very significant fact that in American school systems in general the course of study and schemes of promotion are adjusted to meet the needs and abilities of the brighter and stronger child rather than those of the average child.

Time is Money

This condition has a direct relation to our figures for school expenditure, for if these figures are to serve a truly useful end they must evaluate endeavor, not merely by bulk, but in terms of results. They must contain some expression of what we get for our money. It is not enough to know that the annual per capita cost for the child is $30 unless we know something definite of what we purchase for that sum.

This new element will be added when we change our unit of inquiry in reckoning per capita cost. At present the unit of inquiry is the average expenditure for each child in the school system. That is to say, the figure tells us how much it costs to keep a child sitting at a desk for one school year. The unit of inquiry which will give us much more significant information is the one which will tell how much it costs, on the average, to enable the child to take one step forward on his educational journey through the grades.

In systems where the time lost by slow pupils is counterbalanced by the time gained by rapid ones, the average expense of keeping a child in school one year and the expense entailed in sending him forward one grade are just the same. In most systems, however, as we have seen, the time lost by slow pupils is distinctly greater than that gained by rapid ones, and thus the per capita cost of one year's progress is more than the per capita cost of keeping the child in school for one year.

This may be illustrated by considering the case of Danville, Illinois, where the relation between the aggregate number of years that it would have required for all the pupils to reach the grades in which they were last June if they had made normal progress, and the number of years of school attendance actually required is shown in the following table:—

III. DISTRIBUTION OF PUPILS BY GRADES, AGGREGATE YEARS' ATTENDANCE REQUIRED FOR THEM TO REACH THOSE GRADES AT NORMAL PROGRESS, AND AGGREGATE NUMBER OF YEARS ACTUALLY REQUIRED. DANVILLE, ILLINOIS, JUNE, 1911

Grade	Pupils	Aggregate Years of Attendance at Normal Progress	Actual Aggregate Years of Attendance
1	369	369	486
2	343	686	818
3	319	957	1,104
4	333	1,332	1,601
5	266	1,330	1,513
6	240	1,440	1,540
7	204	1,428	1,473
8	186	1,488	1,528
Total	2,260	9,030	10,063

The figures show that if the years lost by slow children in the Danville schools had been counterbalanced by the years gained by rapid pupils, the aggregate number of years of schooling of the children in the elementary grades would have been 9030. The records show, however, that the slow children lost more time than the rapid ones gained, and so the actual aggregate years of attendance was 10,063, or 1033 years more than the normal number.

This is peculiarly a situation where "time is money." The lack of balance between the two groups of slow and rapid pupils in this city has entailed an expenditure on the part of the taxpayers to defray the cost of 1033 extra years of schooling for the children in the elementary grades alone. According to the data published in the report of the United States Commissioner of Education for 1910, the running expenses in the Danville schools amount each year to about $20 per capita, and this figure cannot be far from accurate when applied to the children in the elementary schools. This means that the citizens of Danville have paid about $20,660 extra for the schooling of these children.

Every city where the school years lost amount to more than those gained pays a similar educational tax, the size of which is determined by the preponderance of years lost over years gained and the amount of the annual per capita cost of education in that city. The following table shows the difference between

the number of years lost and the number gained by the elementary school pupils of each city, the per capita cost of schooling, and the loss entailed in paying for the lack of balance between time lost and time gained:—

IV. SURPLUS OF YEARS LOST OVER YEARS GAINED, PER CAPITA COST OF ONE YEAR'S SCHOOLING, AND AGGREGATE EXPENSE INVOLVED IN PAYING FOR THE SURPLUS TIME LOST BY PUPILS, BASED ON RECORDS OF PUPILS IN ELEMENTARY GRADES, JUNE, 1911

City	Surplus of Years Lost Over Years Gained	Per Capita Cost for One Year's Schooling	Aggregate Expense of Surplus Time Lost
Amsterdam	62*	$29.47	$1,827*
Bayonne	2,225	32.66	7,267
Canton	3,325	26.06	8,665
Danbury	294	25.03	735
Danville	1,033	20.39	2,106
E. St. Louis	1,950	27,42	5,346
Elizabeth	2,790	21,76	6,071
Elmira	1,069	25.88	2,766
Hazleton	1,500	19.63	2,944
Indianapolis	2,460	32.13	7,903
Kenosha	1,091	22.12	2,413
Milwaukee	3,096	31.32	9,696
Montclair	1,653	58.30	9,637
Muskegon	972	25.49	2,477
New Orleans	8,076	24.58	19,850
New Rochelle	924	44.05	4,070
Niagara Falls	1,311	28.68	5,193
Passaic	2,305	27.40	6,315
Perth Amboy	2,239	23.40	5,239
Plainfield	1,082	36.42	3,940
Quincy	2,515	22.15	5,570
Racine	1,358	24.93	3,385
Reading	7,177	24.34	17,468
Rockford	1,193	56.55	6,746
Schenectady	3,135	28.45	8,919
Syracuse	5,941	28.23	16,771
Topeka	1,286	28.88	3,713
Trenton	4,718	29.91	14,111
Watertown	1,631	23.25	3,792
Total	68,287		$191,281

* 62 years gained at a saving of $1,827.

The grand total of $191,281 is the extra amount that it has cost for the maladjustment of courses of study and systems of promotion to the abilities of the children in these schools. This

is not annual cost, but the total involved in the schooling of all the children whose records were studied. As the average number of years of school attendance among these children is almost exactly 4.2 years, the annual expenditure for the surplus of lost time is about $45,543.

Annual Per Capita Cost

The foregoing figures furnish measures of the extent and money cost of the maladjustment between the capabilities of the children, the difficulty of their school work, and the flexibility of the promotion systems, but they do not give us any expression of the comparative degree of importance of this maladjustment in the different cities, or its effect on the per capita cost of school support. How these data may be secured is illustrated by referring back to the case of Danville. As Table III shows, the aggregate number of years of schooling for all the children at normal progress would be 9,030, while the actual aggregate years of attendance are 10,063.

This is 111 per cent of the normal number. In Danville the annual per capita cost of keeping a child in school is $20.39. As the actual time required by the children to reach their present grades is 111 per cent of the normal time, the cost of completing the work of each grade is 111 per cent of the cost of keeping the child in school one year, or $22.63. In a similar way we may compute for each city the relation in percentages between the normal time and the actual time required to complete any unit of work, and how this affects the cost of carrying a child forward one grade as contrasted with merely keeping him in school one year. These computations follow on p. 11.

Summary:—

1. A study of the school histories of 206,495 children in the elementary grades of twenty-nine cities indicates that in most cities the years lost by slow pupils amount to much more than the years gained by rapid pupils, the proportion in the average city being 6.5 years lost for every year gained.
2. In most cities the course of study and system of promotions are adapted to the capabilities of the bright rather than to those of the average child.

V. PER CENT THAT ACTUAL AGGREGATE YEARS OF SCHOOLING ARE OF NORMAL YEARS OF SCHOOLING, AND ANNUAL PER CAPITA COST OF PROMOTING ONE CHILD ONE GRADE IN EACH OF TWENTY-NINE CITY SCHOOL SYSTEMS RANKED ACCORDING TO THE PERCENTAGES

No.	City	Per Cent Actual Years of Schooling are of Normal Years of Schooling	Actual Annual Per Capita Cost	Cost of Promoting One Child One Grade
1	Amsterdam	99	$29.47	$29.18
2	Milwaukee	101	31.32	31.63
3	Indianapolis	102	32.13	32.77
4	Rockford	105	56.55	59.38
5	New Rochelle	106	44.05	46.69
6	Topeka	106	28.88	30.61
7	Danbury	107	25.03	26.78
8	Muskegon	107	25.49	27.27
9	Bayonne	108	32.66	35.27
10	Racine	108	24.93	26.92
11	New Orleans	109	24.58	26.79
12	E. St. Louis	110	27.42	30.16
13	Niagara Falls	110	28.68	31.55
14	Danville	111	20.39	22.63
15	Elizabeth	111	21.76	24.15
16	Schenectady	111	28.45	31.58
17	Syracuse	111	28.23	31.34
18	Passaic	112	27.40	30.69
19	Plainfield	112	36.42	40.79
20	Quincy	112	22.15	24.81
21	Watertown	112	23.25	26.04
22	Hazleton	114	19.63	22.38
23	Kenosha	114	22.12	25.22
24	Canton	115	26.06	29.97
25	Elmira	115	25.88	29.76
26	Montclair	116	58.30	67.63
27	Perth Amboy	116	23.40	27.14
28	Reading	119	24.34	28.96
29	Trenton	132	29.91	39.48
	Average	111	$29.27	$32.33

3. In these twenty-nine cities the annual money cost to the taxpayers of the maladjustment of the course of study and systems of promotion to the capabilities of the children amounts to about $45,543.
4. In the average city this maladjustment involves an increase in school expense amounting to about 11 per cent.

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